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"Hypersonic Airplane Space Tether Orbital Launch System"

The Hypersonic Airplane Space Tether Orbital Launch (HASTOL) system is an architecture for a low-cost satellite launch system designed to provide an additional order of magnitude reduction in the cost of transporting people and materials from Earth to Orbit (ETO) relative to rocket-powered SSTOs. This architecture for ETO transportation was chosen because it offers the best opportunity for practical industrialization space and the eventual colonization of the solar system. The system architecture consists of several elements: an air-breathing subsonic to hypersonic vehicle which transports the payload from the ground to some intermediate point, the details of which are the subject of an optimization study; a tether system which then transports the payload from the intermediate point to orbit; and a grapple system for transferring the payload from the hypersonic vehicle to the tether.

The system is revolutionary in that it minimizes, and perhaps even eliminates, the use of rockets for satellite launch, while limiting the design requirements for a reusable air-breathing hypersonic vehicle to Mach 10. The benefits which accrue from the eventual development of this system are a reusable "pipeline" from runways near the equator to Medium Earth Orbit (MEO). This proposal will directly support the NASA pillars for revolutionary technology leaps and low-cost space access.

The HASTOL team consists of Boeing, Tethers Unlimited, Inc. (TUI), and the University of Maryland (UMd). Each member brings unique capabilities to the proposed effort. Boeing has experience and capability in the design of hypersonic vehicle concepts and has performed work for NASA in the area of advanced tether concepts. TUI has been awarded several contracts for the development of revolutionary tether concepts. UMd is a NASA-recognized center of excellence in hypersonics, and has worked with both Boeing and TUI on previous hypersonic vehicle and tether efforts.